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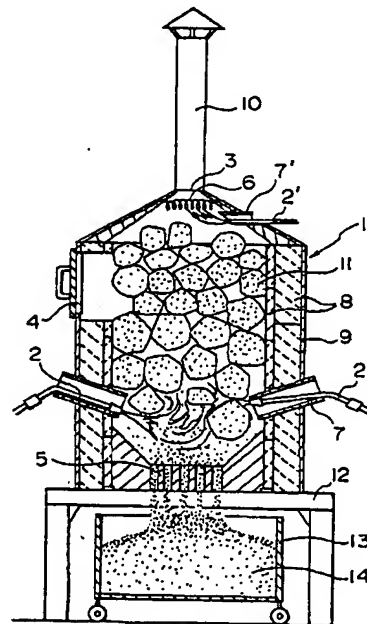
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(54) 【発明の名称】 有機砂の再生装置

(57) 【要約】

【目的】 種々の有機砂を少量ずつ処理することも可能で、砂型製造用としてさらさらした良好な品質の砂を再生する構造簡易で維持管理も容易な装置を提供する。

【構成】 天井部に排気口と上部に有機砂投入口と底部に再生砂を選別して排出する耐火格子口とを備えた燃焼用耐火容器と、1以上の加熱燃焼手段とから成る有機砂の再生装置である。この加熱燃焼手段は、燃焼用耐火容器の下側部に設けられている。



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## 【特許請求の範囲】

【請求項1】 天井部に排気口と上部に有機砂投入口と底部に再生砂を選別して排出する耐火格子口とを備えた燃焼用耐火容器と、1以上の加熱燃焼手段とから成る有機砂の再生装置であって、前記加熱燃焼手段が燃焼用耐火容器の下側部に設けられていることを特徴とする前記有機砂の再生装置。

【請求項2】 前記燃焼用耐火容器の上部かつ排気口付近に、後加熱燃焼手段及び／又は赤熱しうる線状体が更に設けられて成る請求項1に記載の有機砂の再生装置。

## 【発明の詳細な説明】

## 【0001】

【産業上の利用分野】本発明は、例えば有機自硬性鑄物砂型を破碎又は粉碎した塊から、砂型製造用としてさらさらした良好な品質の砂を再生する構造の簡易な装置に関するものである。

## 【0002】

【従来の技術】鑄造用砂型は、一般に、粘土物質を被覆した生砂型とフェノール樹脂などの有機物で被覆した砂を用いて形成される砂型が用いられている。鑄物を製造する工程においては、この鑄造用砂型を使用して鑄物を製造した後に解型して破碎又は粉碎した砂やその塊（本明細書において、有機砂という）が多量に発生する。そこで、このような有機砂（の塊）を再生処理するため、従来から種々の方法あるいは装置が提案されている。例えば、特開昭59-30994号公報には、天井部に粉末回収装置に通ずるダクトを配し、塔の直胴下方に原料の投入口と熱風の吹込口を配し、底部には互いに反対方向に回転する二機の回転羽根車を配し、原料を投入口から二機の回転羽根車に吹き当てながら二機の回転羽根車で小さな塊に破碎する装置が開示されている。また、特開平5-318021号公報には、鑄造用砂型を分解した塊を破碎し、さらに機械的にスクラッピングして接着剤を剥し取って、再生鑄物砂を回収する方法が開示されている。更に、特開昭53-19535号公報には、樹脂や粘土などで被覆された使用後の鑄型用砂をサイジングし、粘土をろい物質に転化しかつドロマイト性石灰を酸化物に転化する温度に焼成し、更にその砂粒子をはげしい攪拌にかけて不活性のろい物質からなるコーティングを破裂又は分割させ清浄化する方法が開示されている。あるいは、流動焙焼炉のような大型キルンを通して砂粒子表面のコーティング材を剥離させる方法も知られている。

## 【0003】

【発明が解決しようとする問題】しかしながら、前記従来公知の有機砂を再生する方法あるいは装置は、極めて複雑な工程や長い処理時間を要したり、あるいは特別に複雑で大がかりな装置であるため、有機砂を大量に処理するにはよいが、種々の有機砂を少量ずつ処理するには適当でなく、品質の良好な再生砂を得ることが困難であ

るうえ、装置の維持管理も容易でない。

【0004】本発明は、種々の有機砂を少量ずつ処理することも可能で、砂型製造用としてさらさらした良好な品質の砂を再生する構造簡易で維持管理も容易な装置を提供することを目的とする。

## 【0005】

【課題を解決するための手段】前記目的を達成するために、本発明の有機砂の再生装置は、天井部に排気口と上部に有機砂投入口と底部に再生砂を選別して排出する耐火格子口とを備えた燃焼用耐火容器と、1以上の加熱燃焼手段とから成る有機砂の再生装置であって、加熱燃焼手段が燃焼用耐火容器の下側部に設けられていることを特徴とする。

【0006】また、本発明の有機砂の再生装置は、前記有機砂の再生装置であって、燃焼用耐火容器の上部かつ排気口付近に後加熱燃焼手段及び／又は赤熱しうる線状体が更に設けられて成る。

## 【0007】

【実施例】以下、本発明の実施例を図面に基つて説明する。図1は、本発明における一実施例の有機砂の再生装置の断面図である。

【0008】本発明の一実施例の有機砂の再生装置は、燃焼用耐火容器1に加熱燃焼手段2と排気口3と有機砂投入口4と再生砂を選別して排出する耐火格子口5とが設けられた構成である。燃焼用耐火容器1は、金属製容器9の内側に耐火材8を内張りした耐火・耐熱構造である。耐火容器1を円筒状にすると、有機砂の塊の棚吊り現象を予防することができるので好ましい。加熱燃焼手段2としては例えばガスバーナー、灯油バーナーであり、耐火容器1の下部かつ側部（下側部）に1（基）以上、均一に加熱するためには好ましくは2（基）又は3（基）設けられる。例えばガスバーナーの場合は、耐火容器1の下側部に金属製容器9と耐火材8とを水平面から所定の角度の傾きを持って貫通して設けられた加熱口7に、例えば耐火容器1内の中ほどの温度が410～1170℃程度となるように、耐火容器の内側に向かってやや下向きに火炎を放射できるように挿入し装着して順次燃焼できるように耐火格子を通過し落下するまでの時間を格子間隙制御により通常25～75分程度にする。排気口3は、耐火容器1の天井部に設けられており、煙突10を設置するのが好ましい。天井部はフード状にして排気口3を設けるのが好ましい。有機砂投入口4は、有機砂を投下しやすいように耐火容器1の（天井部を含む）上部に設けられており、開閉を容易にするため把手の付いた扉を備えているのが好ましい。耐火格子口5は、耐火容器1の底部に設けられており、格子の間隙を例えば3～14mmの範囲に制御することにより、順次燃焼した後に落下してくる再生砂を選別して、さらさらした良好な品質の砂粒14を土台12の下側に配置される回収容器13に目づまりなく排出する。

【0009】本発明の他の一実施例の有機砂の再生装置は、燃烧用耐火容器 1 に加熱燃烧手段 2 と排気口 3 と有機砂投入口 4 と再生砂を選別して排出する耐火格子口 5 と後加熱燃烧手段 2' 及び／又は赤熱しうる線状体 6 とが設けられた構成である。この後加熱燃烧手段 2' は、耐火容器 1 の下側部に設けられた加熱燃烧手段 2 により有機砂（の塊）11 に被覆されている有機物が燃烧して発生するガス（未燃烧ガス）を完全に燃烧して、煙や臭気の排出を防止するため、耐火容器 1 の上部かつ排気口 3 付近に設けられている（天井部をフード状にした場合にはフードに設けるのが好適）。後加熱燃烧手段 2' も例えばガスバーナー、灯油バーナー、あるいは電熱加熱器であり、フードあるいは耐火容器 1 の上部にその壁を貫通して設けられた後加熱口 7' 中に挿入し装着される。線状体 6 は、具体的には、鉄線、ニクロム線などのように耐火容器 1 内からの熱あるいはバーナーなどの後加熱燃烧手段 2' による加熱あるいは電気などにより容易に赤熱しうるものであり、耐火容器 1 の上部かつ排気口 3 付近に設けられている（天井部をフード状にした場合にはフードに設けるのが好適）。バーナーなどにより直接加熱する場合には、バーナーの火炎に接触する位置に設けるのが好ましい。

【0010】

【発明の作用及び効果】本発明の有機砂の再生装置は、燃烧用耐火容器の下側部に設けられた 1 以上の加熱燃烧手段により、耐火容器の上部の有機砂投入口から投入された有機砂（の塊）が火炎に表面から順次加熱されるので、砂に被覆されているフェノール樹脂などの有機物はその表面から順次燃烧崩壊して再生砂がさらさらと順次落下し、滞留加熱が防止される。また、耐火容器の下部

には、耐火格子口が設けられているので、その格子の間隙を制御することにより、落下してくる再生砂の粒の大きさを選別し一定にして、耐火容器の下に配置される再生砂の回収容器などに排出することができる。そのため、鑄物砂として再使用可能な均質で良好な品質の砂を再生できる。また、本発明の装置は構造が極めて簡易で容器や排出格子口などが耐熱性、耐火性であるので、その操業、維持管理のための特別に繁雑で困難な作業や設備が不要であるばかりでなく寿命も長い。このように小型の装置として適した構造であるので、種々の有機砂を少量づつ処理することもできる。

【0011】燃烧用耐火容器の上部かつ排気口付近に後加熱燃烧手段及び／又は赤熱しうる線状体が設けられた本発明の有機砂の再生装置は、燃烧用耐火容器の下側部に設けられた加熱燃烧手段により、有機砂に被覆されている有機物が燃烧して発生するガス（未燃烧ガス）を前記後加熱燃烧手段及び／又は前記赤熱しうる線状体によって完全に燃烧させるので、煙や臭気の排出を完全に防止することができる。

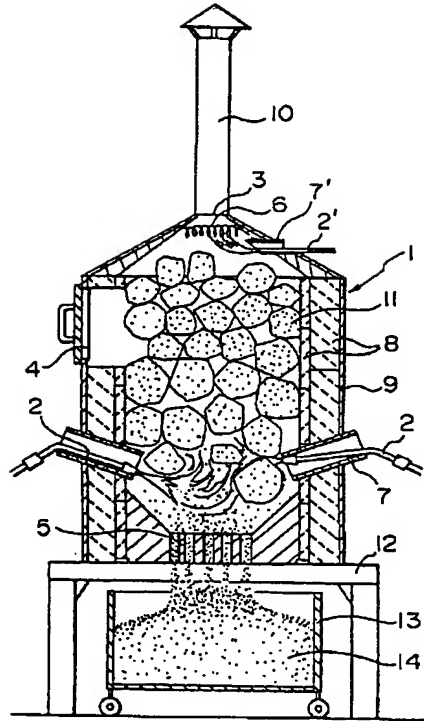
【図面の簡単な説明】

【図 1】本発明における一実施例の有機砂の再生装置の断面図である。

【符号の説明】

- 1 燃烧用耐火容器
- 2 加熱燃烧手段
- 2' 後加熱燃烧手段
- 3 排気口
- 4 有機砂投入口
- 5 再生砂を選別して排出する耐火格子口
- 6 赤熱しうる線状体

【図1】



## PATENT ABSTRACTS OF JAPAN

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(71)Applicant : JIDOSHA IMONO KK

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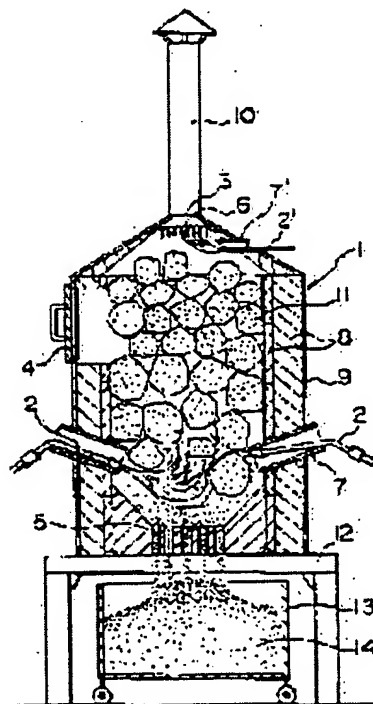
KOBAYASHI YOSHIKAKI

## (54) RECONDITIONING EQUIPMENT FOR ORGANIC SAND

(57)Abstract:

**PURPOSE:** To prevent the stay and the heating of the reconditioned sand by successively heating the organic sand thrown from an organic sand charging port at the upper part from the surface by the flame of a heating means provided on the lower side part of a refractory container for burning to allow the organic matter to be successively burned and collapsed from the surface and allow the reconditioned sand to be successively fallen.

**CONSTITUTION:** A refractory container 1 for burning is provided with a heating means 2, an exhaust port 3, an organic sand charging port 4, and a refractory grate port 5 to select and discharge the reconditioned sand. The refractory container 1 for burning is the refractory and heat resistant structure where a refractory material 8 is lined on the inner side of a metallic container 9. The heating and burning means 2 includes a gas burner, a kerosine or the like. The refractory grate port 5



controls the space of the lattice to the prescribed value, selects the reconditioned sand which is successively fallen after being burned, and discharge the fine-grained sand granules 14 of excellent quality into a collecting container 13 arranged below a base 12 without being clogged. This constitution reconditions the homogeneous sand of excellent quality which is capable of being re-used as the casting sand.

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## CLAIMS

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[Claim(s)]

[Claim 1] The regenerative apparatus of said organic sand which is the regenerative apparatus of the organic sand which consists of the fireproof container for combustion equipped with fireproof grid opening which sorts out and discharges reconditioned sand in the head-lining section in an exhaust port and the upper part at organic sand input port and a pars basilaris ossis occipitalis, and one or more heating combustion means, and is characterized by forming said heating combustion means in the bottom section of the fireproof container for combustion.

[Claim 2] the upper part and near an exhaust port said fireproof container for combustion -- an afterbaking combustion means and/or the line which may burn -- the regenerative apparatus of the organic sand according to claim 1 which the body is established further and changes.

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[Translation done.]

## DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Industrial Application] This invention relates to the simple equipment of the structure which reproduces the sand of the good quality been smooth as an object for sand-mold manufacture from the lump which crushed or ground for example, the organic self-hardening molding sand mold.

[0002]

[Description of the Prior Art] The green sand mold which, as for the sand mold for casting, generally covered the clay matter, and the sand mold formed using the sand which covered with the organic substance, such as phenol resin, are used. In the process which manufactures a casting, after manufacturing a casting using this sand mold for casting, the sand which carried out the solution type, and was crushed or ground, and its lump (in this specification, it is called organic sand) are generated so much. Then, in order to regenerate such organic sand (lump), various approaches or equipment are proposed from the former. For example, the duct which leads to a powder recovery system is arranged on the head-lining section, the input port of a raw material and blowing-in opening of hot blast are arranged on the body lower part of a column, two sets of the moving-vane vehicles mutually rotated to an opposite direction are allotted to a pars basilaris ossis occipitalis, and the equipment which blows a raw material on two sets of moving-vane vehicles from input port, and crushes it in a lump small with reliance at two sets of moving-vane vehicles is indicated by JP,59-30994,A. Moreover, the lump which disassembled the sand mold for casting is crushed to JP,5-318021,A, scrubbing is carried out to it still more mechanically, adhesives are removed, and the method of collecting playback molding sand is indicated. Furthermore, it calcinates to the temperature which carries out sizing of the sand for mold after the use covered with resin, clay, etc. to JP,53-19535,A, and converts clay into the weak matter, and converts dolomite nature lime into an oxide, and the approach of making explode or divide coating which consists of inactive weak matter, applying the sand particle to intense churning further, and defecating it is indicated. Or the method of making the coating material on the front face of a sand particle exfoliate through large-sized kiln like a fluidized bed roaster is also learned.

[0003]

[Problem(s) to be Solved by the Invention] however -- although it is good for processing organic sand in large quantities since the approach or equipment which reproduces said conventionally well-known organic sand requires a very complicated process and the long processing time or it is complicated and large-scale equipment specially -- various organic sand -- every [ small quantity ] -- it is not suitable to process and the maintenance of equipment is not easy to obtain the good reconditioned sand of quality a difficult top, either.

[0004] the structure which reproduces the sand of the good quality which this invention can also process various organic sand small quantity every, and was been smooth as an object for sand-mold manufacture -- it is simple and a maintenance is also aimed at offering easy equipment.

[0005]

[Means for Solving the Problem] In order to attain said purpose, the regenerative apparatus of the organic sand of this invention is a regenerative apparatus of the organic sand which consists of the fireproof container for combustion equipped with fireproof grid opening which sorts out and discharges reconditioned sand in the head-lining section in an exhaust port and the upper part at organic sand input port and a pars basilaris ossis occipitalis, and one or more heating combustion means, and is characterize by to form the heating combustion means in the bottom section of the fireproof container for combustion.

[0006] moreover, the regenerative apparatus of the organic sand of this invention -- the regenerative apparatus of said organic sand -- it is -- the upper part and near an exhaust port the fireproof container for combustion -- an afterbaking combustion means and/or the line which may burn -- the body is established further and changes.

[0007]



[Example] Hereafter, the example of this invention is explained based on a drawing. Drawing 1 is the sectional view of the regenerative apparatus of the organic sand of one example in this invention.

[0008] The regenerative apparatus of the organic sand of one example of this invention is the configuration that the fireproof grid opening 5 which sorts out and discharges the heating combustion means 2, an exhaust port 3, organic sand input port 4, and reconditioned sand in the fireproof container 1 for combustion was formed. The fireproof containers 1 for combustion are the fire-resistance and thermal protection system which lined refractory material 8 inside the metal container 9. If the fireproof container 1 is made into the shape of a cylinder, since bridging \*\*\*\*\* of the lump of organic sand can be prevented, it is desirable. in order to be a gas burner and a kerosene burner as a heating combustion means 2 and to heat to homogeneity more than one (radical) at the lower part and the flank (bottom section) of the fireproof container 1 -- desirable -- 2 (radical) -- or it is prepared three (radical). In the case of a gas burner, the metal container 9 and refractory material 8 from a horizontal plane at the bottom section of the fireproof container 1 to for example, the heating opening 7 prepared by having and penetrating the inclination of a predetermined include angle For example, so that the temperature of the middle in the fireproof container 1 may become about 410-1170 degrees C It inserts and equips and time amount until it passes a fireproof grid and falls so that sequential combustion can be carried out is usually carried out in about 25 - 75 minutes by interstice control so that a flame can be emitted a little downward toward the inside of a fireproof container. The exhaust port 3 is established in the head-lining section of the fireproof container 1, and it is desirable to install a chimney stack 10. As for the head-lining section, it is desirable to make it the shape of a hood and to establish an exhaust port 3. In order to establish organic sand input port 4 in the upper part (the head-lining section is included) of the fireproof container 1 so that it may be easy to drop organic sand, and to make closing motion easy, it is desirable to have the door to which the handle was attached. The fireproof grid opening 5 is formed in the pars basilaris ossis occipitalis of the fireproof container 1, and by controlling in the range of 3-14mm, the reconditioned sand which falls after carrying out sequential combustion is sorted out, and it discharges the gap of a grid that there is no loading in the container 13 for recycling arranged in the sand granules 14 of the good quality been smooth at the foundation 12 bottom.

[0009] the fireproof grid opening 5 which the regenerative apparatus of the organic sand of other one example of this invention sorts out the heating combustion means 2, an exhaust port 3, organic sand input port 4, and reconditioned sand in the fireproof container 1 for combustion, and is discharged, afterbaking combustion means 2', and/or the line which may burn -- it is the configuration that the body 6 was established. In order that this afterbaking combustion means 2' may burn completely the gas (unburnt glow gas) which the organic substance covered with the heating combustion means 2 formed in the bottom section of the fireproof container 1 by organic sand (lump) 11 burns and generates and may prevent discharge of smoke or an odor, It is prepared in the upper part of the fireproof container 1, and the exhaust-port 3 neighborhood (when the head-lining section is made into the shape of a hood, preparing in a hood is suitable). Afterbaking combustion means 2' is also a gas burner, a kerosene burner, or an electric heat heater, and it is inserted and equipped with it into afterbaking opening 7' prepared in the upper part of a hood or the fireproof container 1 by penetrating the wall. a line -- the body 6 may become red-hot easily like a low carbon steel wire and a nichrome wire with heating or an electrical and electric equipment by afterbaking combustion means 2', such as a heat out of the fireproof container 1, or a burner, etc., and, specifically, be prepare in the upper part of the fireproof container 1, and the exhaust port 3 neighborhood (when the head lining section be make into the shape of a hood, prepare in a hood be suitable). When heating directly with a burner etc., it is desirable to prepare in the location in contact with the flame of a burner.

[0010]  
[Function and Effect of the Invention] The organic sand (lump) into which the regenerative apparatus of the organic sand of this invention was fed from the organic sand input port of the upper part of a fireproof container by one or more heating combustion means formed in the bottom section of the fireproof container for combustion carries out sequential combustion collapse of the organic substance, such as phenol resin covered by sand since sequential heating is carried out from a front face at a flame,

from the front face, reconditioned sand is smooth sequential fall, and stagnation heating is prevented. Moreover, since fireproof grid opening is prepared in the lower part of a fireproof container, by controlling the gap of the grid, the magnitude of the grain of the falling reconditioned sand can be sorted out, and it can fix, and can discharge in the container for recycling of the reconditioned sand arranged under a fireproof container etc. Therefore, the sand of homogeneous and good quality reusable as molding sand is reproducible. Moreover, the equipment of this invention has very simple structure, and since a container, discharge grid opening, etc. are thermal resistance and refractoriness, being not only unnecessary but a life is extraordinarily [ for the operation and a maintenance ] long [ complicated and difficult an activity or a facility ]. Thus, since it is the structure for which it was suitable as small equipment, various organic sand can also be processed small quantity every.

[0011] the upper part and near an exhaust port the fireproof container for combustion -- an afterbaking combustion means and/or the line which may burn -- the regenerative apparatus of the organic sand of this invention with which the body was established the gas (unburnt glow gas) which the organic substance covered by organic sand burns and generates with the heating combustion means formed in the bottom section of the fireproof container for combustion -- said afterbaking combustion means and/or said line which may burn, since it is made to burn completely with the body Discharge of smoke or an odor can be prevented completely.

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[Translation done.]

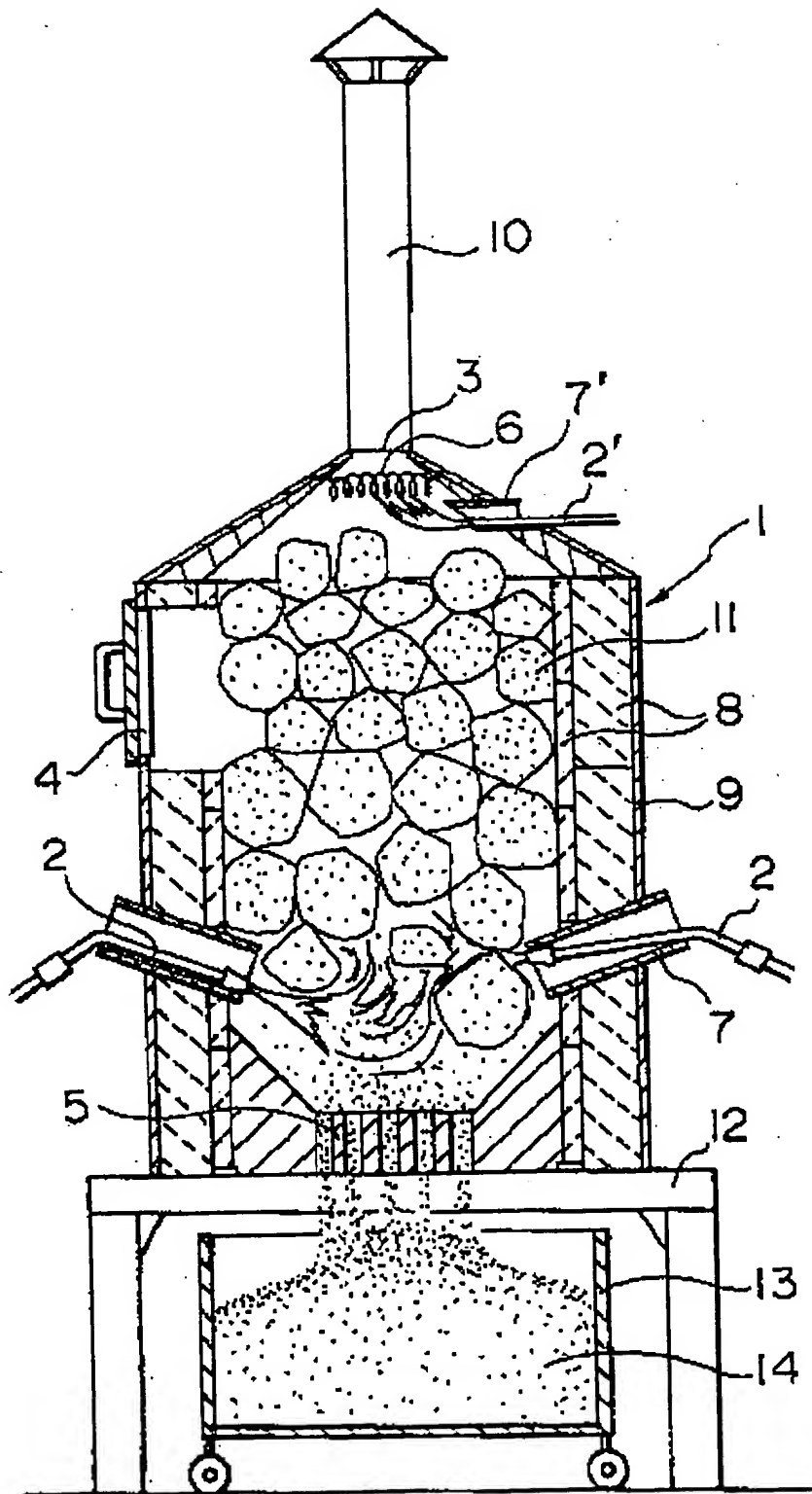
## TECHNICAL FIELD

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[Industrial Application] This invention relates to the simple equipment of the structure which reproduces the sand of the good quality been smooth as an object for sand-mold manufacture from the lump which crushed or ground for example, the organic self-hardening molding sand mold.

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[Translation done.]



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